Designing and Assessing Supportability in DOD Weapon Systems:

A Guide to Increased Reliability and Reduced Logistics Footprint

Prepared by the
Office of Secretary of Defense

October 24, 2003

OFFICE OF THE UNDER SECRETARY OF DEFENSE

3000 DEFENSE PENTAGON
WASHINGTON, DC 20301-3000

ACQUISITION,
TECHNOLOGY
AND LOGISTICS

18 OCT 2006

MEMORANDUM FOR THE ACQUISITION COMMUNITY

SUBJECT: *Designing and Assessing Supportability in DOD Weapon Systems: A Guide to Increased Reliability and Reduced Logistics Footprint*

In the past year, dramatic changes have been instituted through revision of the Department's acquisition and requirements, now capabilities, generation regulations. A key concept echoed in these new documents is Total Life Cycle Systems Management (TLCSM). The program manager and his staff now have responsibility for a system from cradle to grave.

The *Supportability Guide* is both timely and discerning. It examines the life cycle logistics activities now required of the PM, in the new regulatory environment. It puts the PM's decision-making responsibilities for systems supportability into the appropriate systems engineering context. And it stresses the recurring, life cycle role of the PM to translate and refine the user's desired capabilities into actionable, contractible, and measurable system performance and supportability requirements.

I commend the authors, Mr. Lou Kratz, Assistant Deputy Undersecretary of Defense (Logistics, Plans and Programs) and his staff, for their insight into the new acquisition reality and into the impact of TLCSM on the PM's responsibilities. His ability to strip away jargon in favor of sound, clearly written and timely advice will clearly benefit the Acquisition Community. This Guide should be a 'must read' for all program management professionals.

Mark Schaeffer
Principal Deputy, Defense Systems
Director, Systems Engineering

maintenance aspects of the system's architecture, including maintenance times and resources. This analysis identifies strategic opportunities for focused diagnostics, prognostics, and Performance Monitoring/Fault Localization (PM/FL), leading to reduced system maintenance times and cost drivers. A level of repair analysis (LORA) optimally allocates maintenance functions for maximum affordability.

Once FMECA, FTA, and MAP are completed and system design has been established, Reliability-Centered Maintenance (RCM) develops a focused, cost-effective system preventive maintenance program[2]. RCM uses a system-based methodical approach to determine causes of failure, failure consequences, and a logic tree analysis to identify the most applicable and effective maintenance task(s) to prevent failure, if possible. A maintenance task analysis identifies detailed logistics and support resource requirements to sustain system readiness. Appropriate use of proactive maintenance technologies embodied in diagnostics and prognostics pay system dividends. Integrating on-board and off-board monitoring, testing, data collection, and analysis capabilities can significantly enhance system maintainability and overall supportability. Typically, practices here include enhanced prognosis/diagnosis techniques, failure trend analysis, electronic portable or point-of-maintenance aids, corrosion mitigation, serial item management, automatic identification technology, and data-driven interactive maintenance training. Ultimately, these practices can increase operational availability and readiness at a reduced cost throughout the weapon system life cycle.

RCM provides rules for determining evidence of need for Condition-Based Maintenance (CBM). The goal of CBM is to perform maintenance only upon evidence of need. It is the Department of Defense policy that the tenets of CBM Plus (CBM+) shall be implemented in weapon systems maintenance and logistics support programs where cost effective. CBM+ expands on these basic concepts, encompassing other technologies, processes, and procedures that enable improved maintenance and logistics practices. CBM+ can be defined as a set of maintenance processes and capabilities derived, in large part, from real-time assessment of weapon system condition, obtained from embedded sensors and/or external tests and measurements.

The desirable objective is a force of maintainers with knowledge, skill-sets, and tools for timely maintenance of complex systems through use of technologies that improve maintenance decisions and integrate the logistics processes.

3.5. Milestone C - Production and Deployment Phase

The purpose of the Production and Deployment phase is to achieve an operational capability that satisfies mission needs. Milestone C authorizes entry into Low-Rate Initial Production (LRIP). At Milestone C, the system design should be sufficient to initiate production. The system level technical requirements have been demonstrated to be adequate for acceptable operational capability. The product support strategy is fully defined, a PSI (Product Support Integrator) has been selected, and PBL agreements that reflect performance, support, and funding expectations should be documented and signed. Funding should be identified and available for testing and implementation of the selected performance based logistics strategy with a selected PSI.

---

[2] SAE JA1011 (Evaluation Criteria for RCM Programs) and SAE JA1012 (A Guide to the RCM Standard) are illustrative commercial standards for this method.